UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,461	12/21/2001	John A. Dispenza	129250-001049/US	5477

32498 7590 05/05/2010

CAPITOL PATENT & TRADEMARK LAW FIRM, PLLC
P.O. BOX 1995
VIENNA, VA 22183

EXAMINER	
LIN, KUANG Y	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
05/05/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/029,461
Filing Date: December 21, 2001
Appellant(s): DISPENZA ET AL.

John E. Curtin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 12, 2010 appealing from the Office action mailed October 14, 2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-4, 6-12, 14-16, 19 and 20.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has a comment, as set forth below, on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed

under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

The statutory basis for the rejections set forth below remains the same, notwithstanding the addition of US 5,433,511 to Wei and US 6,151,198 to Prater et al. as evidence to support the rejections. These two references were cited in the Response to Arguments section of the Final Rejection (10/14/09) as evidence to support the Examiner's rebuttal (see page 5 of Final Rejection). In the Appeal Brief, Appellant acknowledged these evidentiary references and presumed that the prior art rejections of the claims were based on the combination of the references listed in the rejection headings and these two evidentiary references (see page 8, last two paragraphs and page 9, last two paragraphs of the Appeal Brief).

NEW GROUNDS OF REJECTION

1. Claims 1-4, 6-8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,344,477 to Miki et al. and further in view of US 5,040,589 to Bradley et al. and as evidenced by US 5,433,511 to Wei and US 6,151,198 to Prater et al.

2. Claims 9-12, 14-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,344,477 to Miki et al. and further in view of US 5,040,589 to Bradley et al. and as evidenced by US 5,433,511 to Wei and US 6,151,198 to Prater et al. as applied to claim 1 above, and further in view of JP 6-292,944.

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

4,344,477	MIKI et al.	08-1982
5,040,589	BRADLEY et al.	08-1991
5,433,511	WEI	07-1995
6,151,198	PRATER et al.	11-2000
JP 6-292,944	IWATA	10-1994

(9) Grounds of Rejection

NEW GROUNDS OF REJECTION

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-4, 6-8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,344,477 to Miki et al. and further in view of US 5,040,589 to Bradley et al. and as evidenced by US 5,433,511 to Wei and US 6,151,198 to Prater et al.

Miki et al. show a method of making a heat exchanger by first placing a hollow preform in a casting mold cavity, and then cast the molten metal into the mold cavity to unite the preform to form the heat exchanger (col. 5, line 1 through col. 6, line 21). Thus, Miki et al. substantially show the invention as claimed except that they do not show to cast semi-solid Mg alloy to unite the conductive core object. However, it is a

common knowledge that Mg alloy possesses high thermal conductivity, it would have been obvious to use Mg alloy as a cast material for forming the fins of the heat exchanger of Miki et al. Further, Bradley et al. show that it is desirable to rheocast (cast semi-solid metal) Mg alloy, instead of die casting of molten Mg alloy, such that to reduce the energy consumption, increase the die service life, etc. (see col. 1, lines 10-51). It would have been obvious to use the semi-solid Mg alloy of Bradley et al. as a casting material in the process of making heat exchanger of Miki et al. in view of the advantage. Note, it is a common practice, as evidenced by US 5,433,511 to Wei (see, for example, col. 6, lines 23-30), that either molten metal or semi-solid may be injected into the mold cavity to unite a preform and form a composite cast article. Also, it is known in the casting art, as evidenced by US 6,151,198 to Prater et al. (see col. 1, lines 11-44), that several potential benefits that could result from casting processes utilizing semi-solid metal and that would differentiate these processes from conventional casting. First, and particularly significant for higher melting alloys, semi-solid metalworking afforded lower operating temperatures and reduced metal heat content (reduced enthalpy of fusion). Second, the viscous flow behavior could provide for a more laminar cavity fill than could generally be achieved with liquid alloys. This could lead to reduced gas entrainment. Third, solidification shrinkage would be reduced in direct proportion to the fraction solidified within the semi-solid alloy, which should reduce both shrinkage porosity and the tendency toward hot tearing. Those benefits, as evidenced by US 6,151,198 to Prater et al., would further motivate those of ordinary skilled in the casting art to use the semi-solid Mg alloy of Bradley et al. as a casting material in the process of making heat

exchanger of Miki et al. The process of Miki et al. as modified by Bradley et al., is expected to form the fins substantially simultaneously and to have a substantially void free interface between the core and the metal slurry since the semi-solid slurry of Bradley et al. is also injected into the mold cavity of Miki to unite the core perform. With respect to claims 3 and 4, it would have been obvious to obtain the optimal composition and process parameters for forming the fins through routine experimentation.

2. Claims 9-12, 14-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,344,477 to Miki et al. and further in view of US 5,040,589 to Bradley et al. and as evidenced by US 5,433,511 to Wei and US 6,151,198 to Prater et al. as applied to claim 1 above, and further in view of JP 6-292,944.

JP 6-292,944 show to continuous cast articles by using a continuous casting machine, which consists of two series of die plates, such that to speed up the casting process. It would have been obvious to place the hollow preform of Miki in the continuous casting machine of JP '944 and injecting the semi-solid Mg alloy of Bradley into the mold cavity of JP '944 for forming the heat exchanger of Miki et al. in view of the advantage. With respect to claims 11 and 12, it would have been obvious to obtain the optimal composition and process parameters for forming the fins through routine experimentation.

(10) Response to Argument

1. Appellant in page 5, first and second paragraphs of the appeal brief stated that the Examiner does not provide any evidence or support for an expectation that the process of Miki et al. as modified by Bradley et al., is expected to form the fins

substantially simultaneously and to have a substantially void free interface between the core and the metal slurry. However, as the metal slurry of Bradley et al. is injected into the mold cavity to unite the hollow core of Miki et al., the process is the same as that of instant process. Thus, it is expected that metal slurry, when harden, in the process of Miki et al. would form a contact area that provides a substantially continuous void free interface between the hollow core and the fins. Further, as stated in the rejection supra, that it is known in the casting art, as evidenced by US 6,151,198 to Prater et al. that several potential benefits that could result from casting processes utilizing semi-solid metal and that would differentiate these processes from conventional casting. One of the benefits is that the solidification shrinkage would be reduced in direct proportion to the fraction solidified within the semi-solid alloy, which should reduce both shrinkage porosity and the tendency toward hot tearing. That is a further evidence that in the process of Miki et al. the metal slurry, when harden, would form a contact area that provides a substantially continuous void free interface between the hollow core and the fins.

2. Appellant in pages 5-7 of the appeal brief expressed disagreement on the Examiner's interpretation of the phrase "substantially continuous void free interface". For sake of argument, since the expressions of "**substantially** simultaneously" and "**substantially** void free" are **qualitative** expressions, even if the solidification process of Miki is some what different from that of instant process, the product of modified process of Miki is still considered the same or substantially the same as that of instant application, i.e. substantially void free interface between the core and the metal slurry

even if the extent of void free interface is some what different from that instant invention. Appellant in pages 5, last paragraph of the appeal brief further stated that the use of word “substantially” is intended to indicate that almost all the "air voids” in a contact area between a core object and fins are removed by the cooling step in claims 1 and 9. However, in the process of Miki et al. as modified by Bradley et al., the metal slurry, when cooled and harden, would also form a heat exchanger with almost all the "air voids” in a contact area between a core object and fins being removed. Thus, the invention as claimed does not define over the process of Mike as modified by Bradley.

3. Appellant in the junction paragraph between pages 6 and 7 of the appeal brief stated that due to the different chemical and physical properties between a semi-solid and a liquid metal, one of ordinary skill in the art would recognize that many parts, components specification of Miki et al. and Bradley et al. would have to be changed and that the principle of operation of Miki et al. and/or Bradley et al. have to be changed. However, applicant failed to disclose in the specification **what operation principle** would be changed by **what properties** and **in what manner or how** when a casting process for casting molten metal is changed to a process for casting semi-solid slurry. Further, it is noted that US 5,433,511 to Wei show that the cast metal, either molten metal or semi-solid, may be injected into the mold cavity to unite a preform and form a composite cast article (see, for example, col. 6, lines 23-30). Wei does not mention any chemical or physical properties which would alter or change the operation principle between casting molten metal and casting semi-solid metal. It is apparent that even if there were chemical or physical properties which would affect the solidification process

of the cast metal, it would have been obvious to those of ordinary skill in the foundry art to manipulate the process parameters to optimize the solidification process.

4. Appellant questioned whether Wei et al. and Prater et al. were combined with Miki et al. and Bradley et al. (pages 8, last two paragraphs and page 9, last two paragraphs of the appeal brief). Throughout the prosecution history it is clear that the disclosures of US 5,433,511 to Wei and US 6,151,198 to Prater et al. were served as evidences for supporting the rejections.

5. Appellant in page 10, fourth paragraph of the appeal brief questioned what features in Miki et al. and Bradley are disclosed and applied to reject claims 9-12, 14-16 and 20. However, as stated in the final rejection, dated October 14, 2010, it recited that "[c]laims 9-12, 14-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,344,477 to Miki et al. and further in view of US 5,040,589 to Bradley et al. as applied to claim 1 above, and further in view of JP 6-292,944". It is abundantly clear the disclosures of those two patents applied to reject claims 9-12, 14-16 and 20 is the same as that of applied to reject to claim 1.

6. Appellant in page 12 of the appeal brief stated that since there is no translation for JP '944 reference, it is not possible for the applicants to determine whether the combination of the JP '944, Miki and Bradley is permissible and whether the pressure or temperature discussed in JP '944 are suitable to be used at the pressure and temperature discussed in Miki and Bradley. The examiner's response: JP '944 is cited simply to show that it is conventional to use a caterpillar type continuous casting machine for continuous casting metallic article, in lieu of conventional batch-wise

casting process, to speed up the output. Since the casting mold is conventionally made of copper or copper alloy of high thermal conductivity material, those molding material is capable of sustaining high temperature and high pressure casting conditions. Thus, there would not be any problem for casting low melting point materials, such as magnesium of Bradley et al. with continuous casting apparatus of JP '944.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Kuang Y. Lin/
Primary Examiner, Art Unit 1793

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700

Conferees:

Jessica Ward

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 1793

Roy King

/ Roy King/

Supervisory Patent Examiner, Art Unit 1793